

VF4 series

40 AMP RELAY
WITH PC BOARD OR
QUICK CONNECT TERMINALS

FEATURES

- 40A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in or PC board terminals.
- Optional mounting bracket.
- Various enclosure options.

CONDITIONS

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

CONTACT DATA

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
 6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC⁽¹⁾.
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C	
		NO	NC
Max. Continuous Current	60A	60A	40A
Max. Make Current ⁽²⁾	120A	120A	45A
Max. Break Current ⁽¹⁾	60A	60A	40A

Max. Switching Power: 50-500 watts DC (voltage dependent)⁽¹⁾.
Min. Recommended Current: 1 amp @ 12VDC.

Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 40 amp contact load.
 250 millivolts, maximum, for normally closed contacts @ 30 amp contact load.

Expected Life: 10 million operations, mechanical; 100,000 operations at 40 amps, 14VDC, resistive load on normally open contact.

INITIAL DIELECTRIC STRENGTH

Between Contacts and Coil: 500V rms.

COIL DATA

Voltage: 6, 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage):
 1.6W, unsuppressed.
 1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

OPERATE DATA

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 7 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

ENVIRONMENTAL DATA

Temperature Range: **Storage:** -40°C to +155°C.
Operating: -40°C to +125°C⁽⁴⁾.
Shock: 20 g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
 10-40 Hz., 1.27 mm double amplitude.
 40-70 Hz., 5 g's constant.
 70-100 Hz., 0.5 mm double amplitude.
 100-500 Hz., 10 g's constant.
Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete.
Flammability: UL94-VO external; UL94-HB or better, internal parts (meets FMVSS 302).

MECHANICAL DATA

Termination: 0.250" quick connect and printed circuit terminals.
Enclosures:
Dust Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Shrouded Dust Cover: Protects relay and relay connector (order separately) from dust and splash.
Weatherproof Cover: Mates with a connector (order separately) to seal relay from salt spray etc. Recommended for under hood application.
Ultrasonic Welded Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Cover Retention: Dust cover will withstand a 33.7 pound (150 Newton) force (axially applied) without detachment. Ultrasonic cover: 50 pound (220 Newton).
Weight: 31 g (1.1 oz.) approximately (dust cover model).

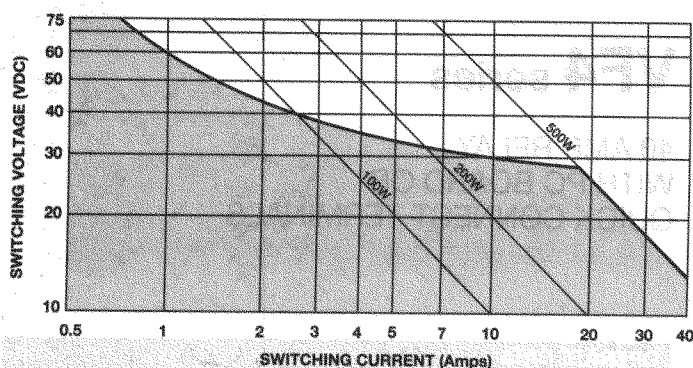
NOTES:

- (1) See Figure 1.
- (2) Inrush current for lamp load.
- (3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
- (4) See Figure 2.

COIL DATA (@ 23°C Coil Temperature)

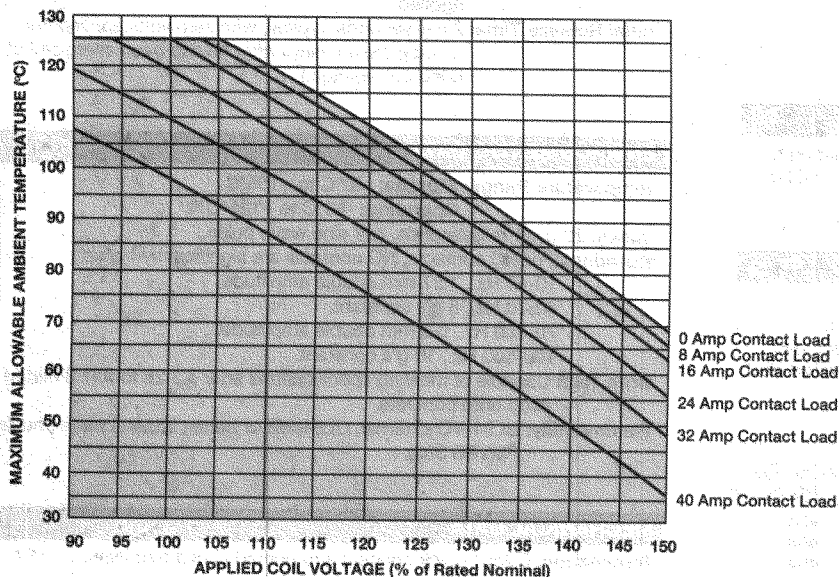
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable ⁽³⁾ Overdrive (VDC)	
					@ 23°C	@ 85°C
D	6	22.5	3.6	0.6	10.1	7.9
F	12	90	7.2	1.2	20.2	15.7
H	24	360	14.4	2.4	40.5	31.5

FIGURE 1 - LIMITING CURVE FOR POWER LOAD



Safe breaking, arc extinguished (normally open contact) for resistive loads.

FIGURE 2 - AMBIENT TEMPERATURE VERSUS COIL VOLTAGE FOR CONTINUOUS DUTY



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
 - = 2°C @ 8 amps
 - = 5°C @ 16 amps
 - = 11°C @ 24 amps
 - = 20°C @ 32 amps
 - = 32°C @ 40 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.6 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

ORDERING INFORMATION

Part Number	Contact Arrangement	Enclosure	Terminals
VF4-11 * 11	1 Form A	Dust cover	Quick connect
VF4-11 * 13	1 Form A	Dust cover	Printed circuit
VF4-15 * 11	1 Form C	Dust cover	Quick connect
VF4-15 * 13	1 Form C	Dust cover	Printed circuit
VF4-21 * 11	1 Form A	Dust cover	Quick connect
VF4-41 * 11	1 Form A	Shrouded dust cover	Quick connect
VF4-45 * 11	1 Form C	Dust cover with bracket	Quick connect
VF4-51 * 11	1 Form A	Dust cover with bracket	Quick connect
VF4-55 * 11	1 Form C	Dust cover with bracket	Quick connect
VF4-61 * 11	1 Form A	Shrouded dust cover with bracket	Quick connect
VF4-65 * 11	1 Form C	Shrouded dust cover with bracket	Quick connect
VF4-71 * 11	1 Form A	Weatherproof cover with bracket	Quick connect
VF4-71 * 13	1 Form A	Weatherproof cover with bracket	Quick connect
VF4-75 * 11	1 Form C	Weatherproof cover with bracket	Quick connect
VF4-75 * 12	1 Form A	Ultrasonic welded dust cover	Quick connect
VF4-75 * 13	1 Form C	Ultrasonic welded dust cover	Printed circuit
VF4-81 * 11	1 Form A	Ultrasonic welded dust cover	Quick connect
VF4-85 * 11	1 Form C	Ultrasonic welded dust cover	Printed circuit (clinch)
		dust cover with molded bracket	Printed circuit
		Ultrasonic welded dust cover	Quick connect
		dust cover with molded bracket	
		Ultrasonic welded dust cover	
		dust cover with molded bracket	

*Standard Coil Voltages: D = 6VDC (Consult factory for availability).
F = 12VDC
H = 24VDC (Consult factory for availability).

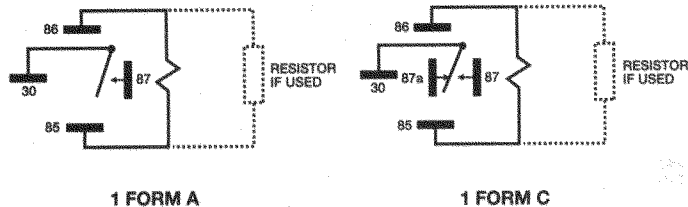
OPTIONAL COIL SUPPRESSION

Add suffix -S07 for 180 ohm resistor in parallel with 6VDC coil.
Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.
Add suffix -S08 for 2,700 ohm resistor in parallel with 24VDC coil.

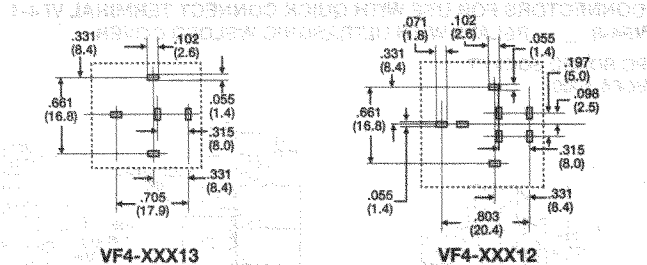
STOCK ITEMS - (The following VF4 series part numbers are normally maintained in stock for immediate delivery:)

VF4-11F11	VF4-15F11-S01	VF4-41F11	VF4-55F11-S01	VF4-75F11-S01	VF4-81F11
VF4-11F13	VF4-15F13	VF4-45F11	VF4-65F11	VF4-75F12	VF4-85F11
VF4-15F11	VF4-15H11	VF4-45F21	VF4-75F11	VF4-75F13	

WIRING DIAGRAMS (Bottom View)

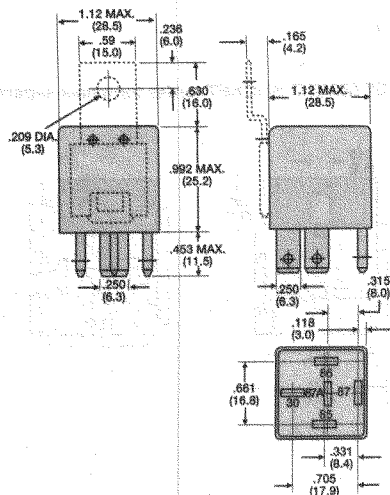


SUGGESTED PC BOARD LAYOUTS (Bottom View)

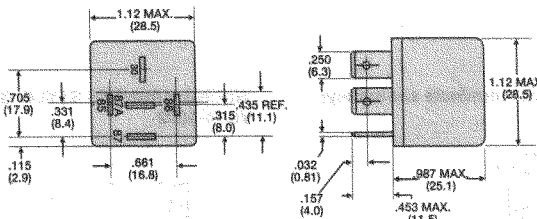


OUTLINE DIMENSIONS

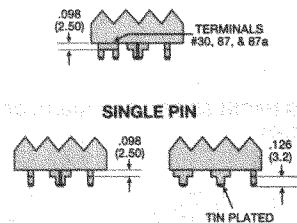
DUST COVER
WITH QUICK CONNECT TERMINALS
VF4-1 & VF4-4



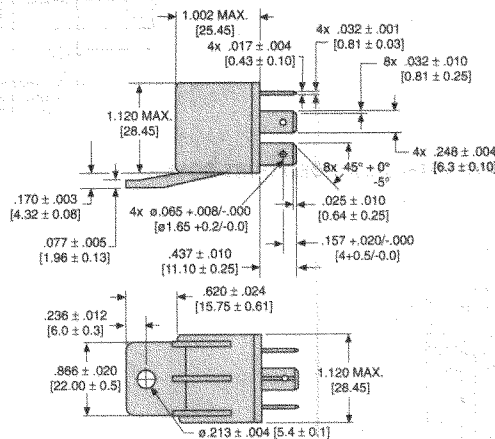
ULTRASONIC WELDED COVER
WITH QUICK CONNECT TERMINALS
VF4-7



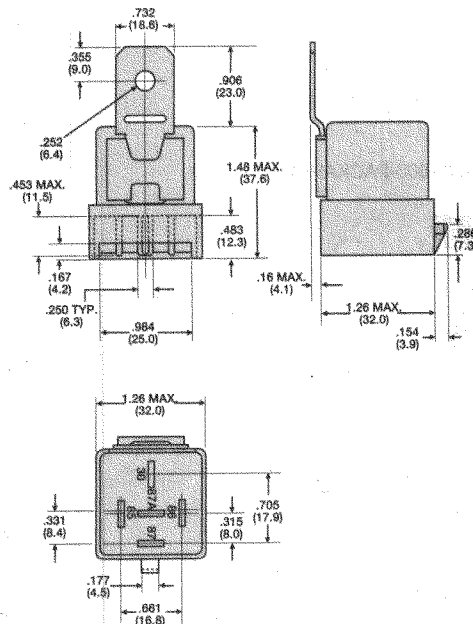
PRINTED CIRCUIT BOARD TERMINALS
CLINCHABLE POWER



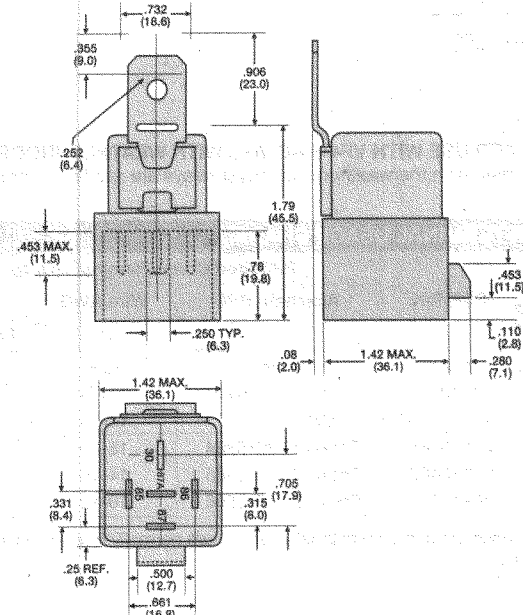
ULTRASONIC WELDED COVER
WITH QUICK CONNECT TERMINALS
VF4-8



SHROUDED DUST COVER
WITH QUICK CONNECT TERMINALS
VF4-5



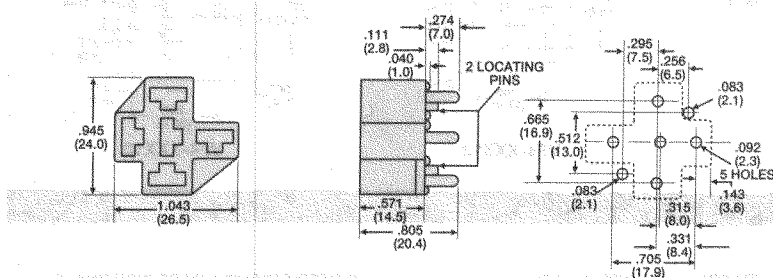
WEATHERPROOF COVER
WITH QUICK CONNECT TERMINALS
VF4-6



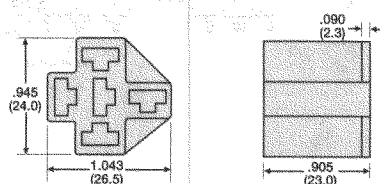
CONNECTORS

CONNECTORS FOR USE WITH QUICK CONNECT TERMINAL VF4-1 AND VF4-4 RELAYS WITH DUST COVER OR VF4-7 AND VF4-8 RELAYS WITH ULTRASONIC WELDED COVER

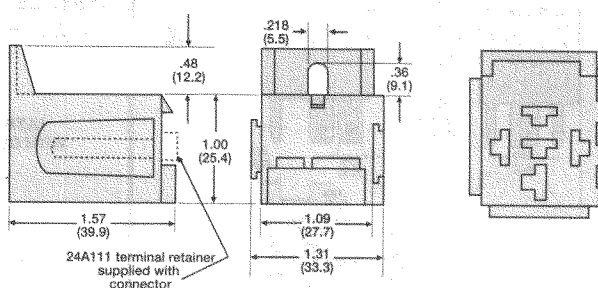
PC BOARD SOCKET
VCF4-1000



WIRING HARNESS STYLE CONNECTOR (order terminals separately)
VCF4-1001

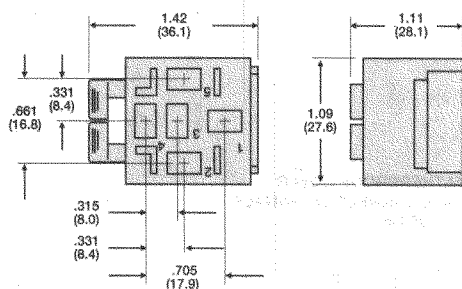


WIRING HARNESS STYLE, BRACKET MOUNT SOCKET (order terminals separately)
VCF4-1002



CONNECTOR FOR USE WITH VF4-5 RELAYS WITH SHROUDED DUST COVER

VCF4-1003
(for VF4 relays with shrouded dust cover)



CONNECTOR FOR USE WITH VF4-6 RELAYS WITH WEATHERPROOF COVER

Connectors to mate with the weatherproof cover relays are available from Packard Electric (1-800-PACKARD).

CONNECTOR/TERMINAL USAGE CHART

Connector	P&B P/N	Required Crimp Terminals (Order Separately)			
		Alternate P/N	Wire AWG	Qty. Required	
				Form A	Form C
VCF4-1000	None	None	N/A	0	0
VCF4-1001	26A1349A 26A1349B	AMP 60249-1 AMP 42281-1	12-16 14-18	4	5
VCF4-1002	26A1348A	Packard 12015864	18-20	4	5
VCF4-1003	26A1348B	Packard 12015865	14-16		
	26A1348C	Packard 12015866	10-12		

All of the P&B connectors and terminals listed above are normally maintained in stock for immediate delivery.